

REMARKS

Claims 23-25 and 27-43 are presently pending in this application. Claim 26 has been cancelled, without prejudice. Claims 34-42 have been withdrawn by the Examiner as being drawn to a non-elected invention.

Claim 23 has been amended to incorporate the subject matter of cancelled claim 26. Claims 30 and 33 have been amended accordingly.

No new matter has been added to the application by the foregoing amendments. Applicants respectfully request that these amendments be entered into the file record and considered by the Examiner.

A three-way restriction requirement was set forth at pages 2-3 of the Office Action, as follows:

Group I: claims 23-33 and 43, drawn to a composite material;

Group II: claims 34-38, 41 and 42, drawn to a process for producing a composite material; and

Group III: claims 39 and 40, drawn to a second process for producing a composite material.

The Office Action asserts that the inventions do not relate to a single general inventive concept because they lack the same or corresponding special technical features for the following reasons:

The common technical feature of the three groups is the composite material of claim 23. However, this composite material allegedly is known in the art, therefore it cannot be a special technical feature. WO 2003/046053 to Rätzsch et al. allegedly teaches the composite material of claim 23. (NOTE: U.S. Patent No. 7,173,104 is being used as an English language equivalent of WO 03/046053), in which the composite material (example 5) comprises up to 300% by weight of wood fibers/particles (5:32-39) and per 100% amine resins (14:26-44) a triazine resin (2:37-58) that has been cured/crosslinked (14:26-40).

Applicants respectfully traverse this restriction requirement and request that the restriction be reconsidered and withdrawn.

Amended claim 23 relates to a composite material with a proportion of wood and with a proportion of crosslinked plastics, the composition from 55 to 90% by weight of wood and from 45 to 10% by weight of crosslinked plastics, where the proportion of wood has been dispersed in the form of particles in the crosslinked plastics, and the crosslinked

plastics are mixtures comprising partially crosslinked ethylene-vinyl acetate copolymers whose vinyl acetate content is from 25 to 40% by weight and crosslinked melamine resin ethers in a mixing ratio of from 2:1 to 1:5. As discussed in detail below, WO 2003/046053 to Rätzsch et al. does not disclose crosslinked plastics are mixtures comprising partially crosslinked ethylene-vinyl acetate copolymers whose vinyl acetate content is from 25 to 40% by weight and crosslinked melamine resin ethers in a mixing ratio of from 2:1 to 1:5, as in present claim 23. Claim 23 represents a common technical feature between the claims of Groups I, II and III. Accordingly, Applicants respectfully request that the restriction requirement be reconsidered and withdrawn and rejoinder of the withdrawn claims.

Provisional Response to Restriction Requirement

To facilitate prosecution of the application and, in order to comply with the Examiner's requirements, Applicants hereby provisionally elect with traverse the claims of Group I (claims 23-25, 27-33 and 43), without prejudice, for initial examination in this application.

Priority Document

Applicants have attached hereto a copy of the Notification concerning receipt by the International Bureau of the German priority document DE 10333893.4.

Specification

The disclosure has been objected to because page six of the original specification refers to the "composite materials as claimed in claim 1". Because the nature of claim 1 can change during the prosecution, as evidenced by the fact that claim 1 has been cancelled already, this creates a variable nature for the disclosure. While Applicants respectfully disagree with the objection, page 6 of the specification has been amended to remove the reference to claim 1.

§102 rejection

Claims 23, 24 and 30-33 and 43 have been rejected under 35 U.S.C. §102(b) as being anticipated by Rätzsch et al. (WO 03/046053). (NOTE: U.S. Patent No. 7,173,104 is being used as an English language equivalent of WO 03/046053).

With respect to claim 23, Rätzsch et al. allegedly teaches a composite material (example 5) comprising up to 300% by weight of wood fibers/particles (col. 5, lines 32-39) per 100% amine resins (col. 14, lines 26-44) and a triazine resin (col. 2, lines 37-58) that can be a melamine resin (col. 2, lines 20-36) that has been cured/crosslinked (col. 14, lines 26-

40). Rätzsch et al. also teaches adding a reactive thermoplastic to the composition (col. 14, lines 36-40). It is alleged that the curing step would also partially crosslink these reactive thermoplastics.

With respect to claim 24, Rätzsch et al. allegedly teaches the wood as being present in fibers or flour (col. 5, lines 19-39). With respect to claims 30 and 31, Rätzsch et al. allegedly teaches the material as being a foamed material, a profile or an injection molded article (abstract). With respect to claim 32, Rätzsch et al. allegedly teaches the linking groups as being other than the excluded group (col. 2, line 58 - col. 3, line 10) and the hydroxyl groups as being exclusively etherified with C1-C18 alkyl groups (col. 3, lines 52-54). With respect to claim 33, Rätzsch et al. allegedly teaches the thermoplastic as being ethylene-vinyl acetate copolymers, polyurethane polymers, or aliphatic or aromatic polyesters (col. 5, line 40 - col. 6, line 55). With respect to claim 43, Rätzsch et al. allegedly teaches a roof element comprising the composite material (col. 16, line 59 - col. 17, line 10).

Applicants respectfully traverse this rejection and request that the rejection be reconsidered and withdrawn.

In order to support an anticipation rejection under §102(b), each and every element of the claimed invention, or its substantial equivalent, must be found within the four corners of a single reference cited by the Examiner to anticipate. Hybritech Inc. v. Monoclonal Antibodies, Inc., 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986).

Rätzsch et al. describes products of polymers containing triazine segments which are synthesized from mixtures of meltable 4- to 18- ring oligotriazine ethers. The products can contain up to 50% by weight of reactive polymers, e.g., saponified ethylene vinyl acetate copolymers (col. 5, lines 43- 44 of the U.S. document) and up to 75% by weight of fillers and/or reinforcing fibers, e.g., wood fibers (col. 5, lines 36-37 of the U.S. document).

Rätzsch et al. does **not** relate to a composite material comprising wood and crosslinked plastics with mixtures of **partially crosslinked** ethylene-vinyl acetate copolymers whose vinyl acetate content is from 25 to 40% by weight and of crosslinked melamine resin ethers in a mixing ratio of from 2:1 to 1:5.

The basic difference between the teaching of Rätzsch et al. and the present invention exist in the use of saponified, e.g., mainly linear ethylene vinyl acetate copolymers according to Rätzsch et al. vs. partially crosslinked ethylene-vinyl acetate copolymers

according to the present invention.

The object of Rätzsch et al. is the preparation of moulding material which can be processed using conventional thermoplastic processing methods. This object is accomplished by providing mixtures comprising meltable oligotriazine ethers, which preferably are composed of 70-90% by weight linear linked aminotriazine ethers (claim 15 of U.S. document).

In order to improve the product characteristics, it is possible to add reactive polymers, e.g., saponified ethylene-vinyl acetate copolymers and fillers and/or reinforcing fibers. The addition of saponified, e.g., mainly linear ethylene-vinyl acetate copolymers leads to a further improvement of the thermoplastic properties of the moulding material. In this context a saponification of the ethylene-vinyl acetate copolymers is important, since only due to the formation of alcoholic end groups during saponification, compatibility between the ethylene-vinyl acetate copolymer and the melamine resin is provided.

The obtained thermoplastic moulding compounds are processable in a thermoplastic manner, since the melamine resin is not crosslinked. Thus, the moulding compounds are not completely cured and can be processed to different products as plates, tubes, profiles and others. The object of the present invention, however, is the preparation of composite materials with a strong network of wood and plastics, which can be produced applying thermoplastic processing techniques, whereby the composite material is characterized by good mechanical properties as a high strength and toughness.

This is achieved by mixing crosslinked melamine resin ethers with partially crosslinked ethylene-vinyl acetate copolymers with vinyl acetate content from 25 to 40% by weight in a mixing ratio of 2:1 to 1:5 according to amended claim 23.

In the production of a composite material with good mechanical properties the use of partially crosslinked ethylene-acetate copolymers is beneficial, since those copolymers are already present as a network and are not linear. During the curing process of the melamine resin a second network of melamine resin is formed. These two networks of ethylene-vinyl acetate copolymer and melamine resin "get stuck" with each other and thus form an interpenetrating network in the final composite. This interpenetrating network requires, therefore, the use of a partially crosslinked ethylene vinyl acetate copolymer instead of a linear one.

The advantage of such network and, thus of the composite material, is

improved mechanical properties of the latter.

The linear ethylene-acetate copolymers of Rätzsch et al., on the other hand, do not form a network. These copolymers also do not react and form a network with the melamine resin. The copolymer is only incorporated into the melamine resin in the final product. Thus, the ethylene-vinyl acetate copolymer exists in the final product solely in a linear manner and not in a crosslinked manner. Also, the wood used as filler is only incorporated into the melamine resin in a loose manner.

The different properties of a moulding compound according to Rätzsch et al. and a composite material according to the present invention can best be seen by comparing their different tensile strengths.

The moulding compounds according to Rätzsch et al. have a tensile strength between 42-62 MPa (see Examples 5.3, 7, 8.2 and 9 of Rätzsch et al.). The composite material according to amended claim 23, on the other hand, is characterized by a tensile elasticity modulus between 3.1 and 4.6 GPa (see table 4 of the present application) and a tensile strength between 65-80 MPa.

Thus, the tensile strength of the present composite material is higher than the examples of moulding compounds according to Rätzsch et al.

The higher tensile strength of the composite material according to claim 23 is caused by the specific crosslinked matrix, whereas the tensile strength of the moulding compounds by Rätzsch et al. is solely achieved by adding cellulose or glass fibers (see Examples 5.2, 7, 8.1 and 9 of Rätzsch et al.).

If a person skilled in the art would like to produce a composite material with good mechanical properties using linear, not crosslinked ethylene-vinyl acetate copolymers, it would hardly work. The addition of linear ethylene-vinyl acetate copolymers would only improve the thermoplastic properties.

However, this would lead to a deterioration of the mechanical properties due to the missing formation of an interpenetrating network.

Rätzsch et al. also does not aim for a strong network between the plastics and the wood fibers mixed into. The optional addition of wood fibers serves only the purpose of strengthening the moulding material.

Thus, the subject of amended claim 23 is novel and not obvious over Rätzsch et al. Accordingly, Applicants respectfully request that the §102(b) rejection be reconsidered

and withdrawn.

§103 rejections

Claim 25 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Rätzsch et al. (WO 03/046053) as applied to claim 23 above, and further in view of Imoto (U.S. Patent No. 5,780,519). (NOTE: U.S. Patent No. 7,173,104 is being used as an English language equivalent of WO 03/046053).

With respect to claim 25, Rätzsch et al. allegedly teaches the composite of claim 23 as shown above, and the wood as being used up to 75% of the composite (col. 14, lines 26-44). The Office Action acknowledges that Rätzsch et al. does not teach the wood as being a combination of fibers and shavings. However, Imoto allegedly teaches using a combination of fibrous wood and wood shavings in a wood composite material (col. 1, lines 53-56 and col. 2, lines 54-56) where the shavings are present in an amount of at least 50 percent of the wood material (col. 7, lines 41-43). Rätzsch et al. and Imoto purportedly are combinable as they are concerned with the same field of endeavor, namely lignocellulose composites. The Office Action contends that it would have been obvious to a person having ordinary skill in the art at the time of invention to have used the combination of wood fillers of Imoto in the composite of Rätzsch et al., and the motivation to do so would have been, as Imoto suggests, it will lower the cost of the composite (col. 7, line 41 – col. 8, line 3).

Applicants respectfully traverse this rejection and request that the rejection be reconsidered and withdrawn.

As reiterated by the Supreme Court in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. ___, 82 U.S.P.Q.2d 1385 (2007), the framework for the objective analysis for determining obviousness under 35 U.S.C. §103 is stated in *Graham v. John Deere*. Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg., No. 195 (October 10, 2007) at page 57527 (hereinafter "Examination Guidelines"). The factual inquiries enunciated by the Court are as follows:

- (1) Determining the scope and content of the prior art;
- (2) Ascertaining the differences between the claimed invention and the prior art; and
- (3) Resolving the level of ordinary skill in the pertinent art.

Examination Guidelines at page 57527.

As discussed in detail above, Rätzsch et al. does not suggest or disclose a

composite material according to amended claim 23.

Imoto describes moulding products comprising at least four components:

- lignocellulose in form of powder, granulate or fibers (column 2, lines 55-56),
- water soluble polymers with at least two OH-groups, a tensile strength of 10-300 MPa and a surface tension of 30-65 mN/m used for even distribution of air bubbles in the moulding (column 3, lines 1-5),
- water soluble polymers with at least two carboxyl groups used for even distribution of adhesives in the moulding (column 3, lines 56-64), and
- polymers with a tensile strength of 0.1-10 MPa, an elongation of 200 to 2000% and a cohesion energy density of 30-200 cal/cc, e.g., ethylene-vinyl acetate copolymer (column 4, line 4-10) used as adhesives.

An object of Imoto is to provide a homogenous lignocellulose containing moulding product and, thus, to prevent the migration of adhesives to the surface of the mouldings during the production process. This is achieved by using water soluble polymers with at least two carboxyl groups and at least two OH-groups.

Imoto does not suggest or disclose the use of a partially crosslinked ethylene-vinyl acetate copolymer. This fact can be concluded from the result of the comparative example 1 (col. 7, lines 9-17). By leaving out the water soluble maleic anhydride copolymer (ISOBAM-104) which is used for the even distribution of the adhesive in the moulding the adhesive ethylene-vinyl acetate copolymer migrates to the surface. Such a migration of the ethylene-vinylacetate copolymer can only take place if said copolymer is present in a linear form in the moulding and not in a crosslinked network.

Imoto also does not teach the use of crosslinked melamine resin ether.

A combination of the teachings of Rätzsch et al. and Imoto would, at the most, lead to moulding material comprising aminotrazine resins, lignocellulose in form of wood fibres, ethylene-vinyl acetate copolymer as adhesive and water soluble polymers with two OH- or carboxyl groups.

By doing so, a person skilled in the art would by no means arrive at a composite material comprising crosslinked melamine resin ethers and partially crosslinked ethylene-vinyl acetate copolymers according to amended claim 23.

Thus, the subject of amended claim 23 is not obvious over Rätzsch et al. in view of Imoto. Claim 25, which depends from claim 23, is distinguishable from Rätzsch et

al. in view of Imoto for the same reasons as set forth above for claim 23. Accordingly, Applicants respectfully request that the §103 rejection be reconsidered and withdrawn.

Claim 26 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Rätzsch et al. (WO 03/046053) as applied to claim 23 above, and further in view of Borsinger et al. (U.S. Patent Publication No. 2003/0229168). (NOTE: U.S. Patent No. 7,173,104 is being used as an English language equivalent of WO 03/046053).

With respect to claim 26, Rätzsch et al. allegedly teaches the composite of claim 23 as shown above. Rätzsch et al. allegedly also teaches the thermoplastic polymer as being ethylene-vinyl acetate (col. 5, lines 40-47) with a vinyl acetate content of 17% by weight (example 7) and being present in an amount up to 100 phr of the amino resin (col. 14, lines 36-40). The Office Action acknowledges that Rätzsch et al. does not teach the claimed vinyl acetate content. However, Borsinger et al. teaches an adhesive composition comprising ethylene vinyl acetate with a vinyl acetate content of 28% by weight (¶0081). Rätzsch et al. and Borsinger et al. allegedly are combinable, as they are concerned with the same field of endeavor, namely hot melt adhesives comprising ethylene-vinyl acetate copolymers. The Office Action contends that it would have been obvious to a person having ordinary skill in the art at the time of invention to have used the high vinyl acetate polymer of Borsinger et al. in the place of the low vinyl acetate polymer of Rätzsch et al., and the motivation to do so would have been, as Borsinger et al. suggests, the high vinyl acetate content increases the pliability of the polymer and the adhesion to cellulose substrates (¶0014).

Applicants respectfully traverse this rejection and request that the rejection be reconsidered and withdrawn.

As discussed in detail above, Rätzsch et al. does not suggest or disclose a composite material according to amended claim 23.

Borsinger et al. relates to waxes prepared from hydrogenated plant oils. The waxes consist mainly of more than 90% triglycerides with stearic acid, as a dominant fatty acid component. The adhesion of the waxes is compared to known adhesives, e.g., an adhesive based on ethylene-vinyl acetate copolymer (see [0081]).

However, Borsinger et al. does not suggest or disclose the use of an adhesive based on a partially crosslinked ethylene-vinyl acetate copolymer, and does not cure this deficiency of Rätzsch et al.

Thus, the subject of amended claim 23 is not obvious over Rätzsch et al. in

view of Borsinger et al. Claim 26, which depends from claim 23, is distinguishable from Rätzsch et al. in view of Borsinger et al. for the same reasons as set forth above for claim 23. Accordingly, Applicants respectfully request that the §103 rejection be reconsidered and withdrawn.

Claims 27-29 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Rätzsch et al. (WO 03/046053) as applied to claim 23 above, and further in view of Medoff et al. (U.S. Patent No. 6,448,307). (NOTE: U.S. Patent No. 7,173,104 is being used as an English language equivalent of WO 03/046053).

With respect to claims 27-29, Rätzsch et al. allegedly teaches the composite of claim 23 as shown above. Rätzsch et al. also teaches adding up to 2 weight percent of a UV absorber (col. 14, lines 40-42). The Office Action acknowledges that Rätzsch et al. does not teach adding a flame retardant, pigment, or auxiliary. However, Medoff et al. allegedly teaches adding a flame retardant, colorant/pigment or lubricant (6:20-28) to a melamine-wood composite. Rätzsch et al. and Medoff et al. purportedly are combinable as they are concerned with the same field of endeavor, namely melamine-wood composites. The Office Action contends that it would have been obvious to a person having ordinary skill in the art at the time of invention to have added the components of Medoff et al. to the composite of Rätzsch et al., and the motivation to do so would have been, as Medoff et al. suggests, these are well known additives in thermosetting compositions (col. 6, lines 20-28). The Office Action acknowledges that Rätzsch et al. does not teach the flame retardant, pigment, or auxiliary as being added in the claimed amounts, but alleges that it is well known in the art to optimize result-effective variables such as ingredient amount. The Office Action contends that would have been obvious to a person having ordinary skill in the art at the time of invention to have optimized the amounts of the components through routine optimization, and the motivation to do so would have been to increase the fire resistance, provide the desired colored product, and to increase the processability respectively.

Applicants respectfully traverse this rejection and request that the rejection be reconsidered and withdrawn.

As discussed in detail above, Rätzsch et al. does not suggest or disclose a composite material according to amended claim 23.

Medoff et al. describes compositions obtained by mixing cellulosic and/or lignocellulosic fibers with different matrix materials, e.g. resins, elastomers, asphalts, tar or

lignins. Useful fibers include paper and paper products, products made of hemp, flax, corn, coconut or wood (col. 4, lines 26-34). Further additives might be included like flame retardants, pigments or stabilizers (col. 6, lines 21-29).

Medoff et al. does not suggest or disclose the use of partially crosslinked ethylene-vinyl acetate copolymers or crosslinked melamine resin ethers according to amended claim 23, and, thus, does not cure the deficiency of Rätzsch et al.

The composition according to Medoff et al. comprises a network of fibers encapsulated within a matrix. The fibers are thought to form a lattice network, which provides the composition with strength. The bonding of the polymers to the fibers is increased due to the texturized surface of the fibers (col. 4, lines 57-64).

Thus, the use of crosslinked polymers is not required since the fibers do provide the necessary strength by forming a network.

The strength of the present composite material, however, is provided by the crosslinked melamine resin and the partially crosslinked ethylene-vinyl acetate copolymer. The wood is incorporated into this network.

By combining the teachings of Rätzsch et al. and Medoff et al., a person skilled in the art would, therefore, arrive at the most at a composition based on a network of texturized cellulosic fibers in which aminotriazine polymers, linear, saponified ethylene-vinyl acetate copolymer, and further additives are incorporated. Hence, such a combination would not provide the composite material according to amended claim 23. Thus, the subject of amended claim 23 is also not obvious over Rätzsch et al. in view of Medoff et al. Claims 27-29, which depend from claim 23, are distinguishable from Rätzsch et al. in view of Medoff et al. for the same reasons as set forth above for claim 23. Accordingly, Applicants respectfully request that the §103 rejection be reconsidered and withdrawn.

Double Patenting Rejections

Claims 23, 24 and 31 have been provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 27 and 29 of co-pending Application No. 11/922,432. Although the conflicting claims are not identical, they allegedly are not patentably distinct from each other because:

Considering claim 23: claim 27 of application '432 teaches a composite material comprising 40 to 85% wood and 15 to 60% by weight of a crosslinked melamine resin ether (claim 19).

Considering claim 24: claim 27 of application '432 teaches the wood as being in the form of flour, particles, granules, fibers or shavings (claim 27).

Considering claim 31: claim 29 of application '432 teaches the product as being a sheet or a profile (claim 29).

Claim 25 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 27 of co-pending Application No. 11/922,432 as applied to claim 23 above, and further in view of Imoto.

Considering claim 25: claim 27 of application '432 allegedly teaches the composite of claim 23 as shown above. Claim 27 of application '432 does not teach the wood as being a combination of fibers and shavings. However, Imoto teaches using a combination of fibrous wood and wood shavings in a wood composite material (1:53-56 and 2:54-56) where the shavings are present in an amount of at least 50% of the wood material (7:41-43).

Claim 27 of application '432 and Imoto are combinable as they are concerned with the same field of endeavor, namely lignocellulsoic composites. The Office Action alleges that it would have been obvious to a person having ordinary skill in the art at the time of the invention to have used the combination of wood fillers of Imoto in the composite of claim 27 of application '432 and the motivation to do so would have been, as Imoto suggests, it will lower the cost of the composite (7:41-8:3).

Claims 27-29 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 22 of co-pending Application No. 11/922,432 in view of Medoff et al. (U.S. Pat. No. 6,448,307).

Considering claim 23: claim 22 of application '432 teaches a composite material comprising 40 to 85% wood and 15 to 60% by weight of a crosslinked melamine resin ether (claim 19).

Claim 22 of application '432 also teaches adding a lubricant, a flame retardant, a pigment and a UV absorber to the composite (claim 22). Claim 22 of application '432 does not teach the flame retardant, pigment, UV absorber, or lubricant as being added in the claimed amounts. However, the Examiner argues, it is well known in the art to optimize result effective variables such as ingredient amount, and it would have been obvious to a person having ordinary skill in the art at the time of the invention to have optimized the amounts of the components through routine optimization, and the motivation to do so would have been to increase the fire resistance, provide the desired colored product, increase the

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stability outdoors, and to increase the processability respectively.

Applicants respectfully traverse these rejections and request that the rejections be reconsidered and withdrawn.

U.S. Patent Application No. 11/922,432 relates to composite material comprising wood, linear melamine resins and optionally non-crosslinked ethylene-vinyl acetate copolymer (see the claims of this application).

Hence, the parallel U.S. Application does not relate to a composite material comprising wood, crosslinked melamine resin and **partially crosslinked** ethylene-vinyl acetate copolymer according to amended claim 23. Claims 23-25, 27-29 and 31 depend from claim 23 and are distinguishable from the cited references above for the same reason as with respect to claim 23.


Accordingly, Applicants respectfully request that the double-patenting rejections be reconsidered and withdrawn.

In view of the remarks above, reconsideration and withdrawal of the rejections and favorable allowance of all claims is respectfully requested.

Respectfully submitted,

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